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book, the author has availed himself of the criticisms of other naturalists, and thus made a considerable number of changes in the stereotype plates. Several of the figures, notably that illustrating the anatomy of the cat, have been changed, and one of the opossum and its marsupial bone added. Other changes have been made in order to bring the book up to the present state of the science.

DAUBREE'S CHEMICAL GEOLOGY.¹—This grand work may be regarded as a revised collected edition of the former smaller papers of M. Daubrée on experimental geology. It may be regarded as the great work of M. Daubrée's most laborious and successful scientific life, and on it he may safely rest his fame.

The first section of the work deals with chemical and physical phenomena—metalliferous deposits, nature of metamorphism, the effect of heated waters, formation of zeolites, amygdaloids, rocks both eruptive and metamorphic, and volcanic action.

The second section treats of mechanical phenomena, and applies the rigid experimental method of trituration and transportation of sediments, and chemical decompositions by mechanical forces; the distribution of gold in the bed of the Rhine is also discussed. The first chapter contains an account of the experiments on the striation of rocks. The marks or striæ are produced or imitated by rubbing pebbles together. The second chapter treats of the deformations which the earth's crust has been subjected to in former ways. Sir James Hall's experiments were of a similar character. The remarkable examples of reversed folds, as shown in the Alpine regions, are imitated and explained. The discussion of the nature and causes of faults, joints and all kinds of fractures in sedimentary rocks will be read by the geologist with peculiar interest. The account of the experiments on the heat developed by the crushing, grinding and mutual frictions of rocks are important; it is believed that sufficient heat may be generated in this way to produce metamorphism.

The second part treats altogether of cosmic bodies. Three hundred and fifty pages are devoted to the experimental study of the structure and genesis of meteorites and the accompanying minerals. The entire volume is well illustrated, and as a specimen of typography may be regarded as a model of clearness and beauty.—*F. V. H.*

HERTWIG'S CHÆTOGNATH WORMS.²—A careful elaboration of the morphology and development of the Sagitta, the type of the Chætognathi, that singular type of worms, so aberrant that it has

¹ *Etudes Synthétiques de Géologie Expérimentale*. Par A. Daubrée. Première partie—Application de la méthode expérimentale à l'étude de divers phénomènes géologiques. Deuxième partie—Application de la méthode expérimentale à l'étude de divers phénomènes cosmologiques. Large 8vo, 828 pages.

² *Die Chætognathen. Ihre Anatomie, Systematik und Entwicklungsgeschichte*. Eine Monographie. Von Dr. OSCAR HERTWIG. Mit 6 Tafeln. Jena, 1880. 8vo, pp. 112.

by different authors been regarded as a vertebrate, a mollusk, as well as a crustacean, has been greatly needed. Dr. Oscar Hertwig is so excellent a histologist and anatomist, that we may feel sure that this investigation has been made with the same exactitude which has characterized his previous labors on the lower animals. Our knowledge of *Sagitta* had already been greatly extended by the researches of Krohn and Kowalevsky, and owing to the results reached by them, no one now doubts but that *Sagitta* is a worm (Vermes), though its place among the classes of Vermes is uncertain. Hertwig concludes that it agrees best with the Nematodes and Annelides.

WADSWORTH'S GEOLOGICAL PAPERS.¹—These papers by Prof. Wadsworth are, like all the preceding writings of this author, of the most thorough character. He has made the microscopic study of igneous and metamorphic rocks a special study for several years, and by his thoroughness has elevated this department of geology very nearly to an exact science. The first paper, on the geology of Lake Superior, is the most important one, and contains six effective octavo plates, showing the relations of the different kinds of rocks to each other; the dykes, bands of iron ores, jasper veins, felsites, diorites are clearly shown in their relations to each other in the rock masses. Mr. Wadsworth has not relied on the microscope alone, but has given many important chemical analyses of minerals. The historical account of the explorations of others in that region, with the bibliography at the end of the memoirs, is very valuable. We wish we could quote largely from these papers, but space will not permit.—*F. V. H.*

PHYSICAL AND GEOLOGICAL RESULTS OF THE FRENCH EXPEDITION TO OBSERVE THE TRANSIT OF VENUS.²—These beautiful volumes are a portion of the results of the French Expedition to observe the Transit of Venus. The first part deals with the physical results of the expedition, printed in fine clear type with eighteen excellent plates, a portion of them photographic. The

¹ *Notes on the Geology of the Iron and Copper Districts of Lake Superior.* By M. E. Wadsworth. Bulletin of the Museum of Comparative Zoölogy at Harvard College, Whole Series, Vol. VII. (Geological Series, Vol. I). pp. 157, with 6 plates.

On the Elongation and Plasticity of Pebbles in Conglomerates. By M. E. WADSWORTH. (From the Proceedings of the Boston Society of Natural History, Vol. XX, Nov. 5, 1879.)

Danalite from the Iron Mine, Bartlett, New Hampshire. By M. E. WADSWORTH.

Picrolite from a Serpentine Quarry in Florida, Mass. By M. E. WADSWORTH.

² *Mission de l'Isle Saint-Paul Observations Astronomiques, opérations photographiques, observations magnetiques et hydrographie.* Institut de France. Academie des Sciences. Recueil de memoires a l'observation du passage de Venus sur le Soleil. (Extrait du tome II, 1st partie.) 425 pp., 4to, 18 plates and maps.

Recherches Geologiques faites, a Aden, a la Reunion, aux Isles Saint Paul et Amsterdam, aux Seychelles. Par M. CH. VELAIN, Maitre de conferences a la Sorbonne. 460 pp., 4to, 25 plates and maps. (Extrait du tome II, 2d partie.) Paris, 1879.